Oxidation and Reduction: For a chemical balance in nature molecules are oxidized and reduced. Atoms are linked into molecules by their electrons. In a covalent bond, the atoms seem to share an electron. Ionic bonds are formed when one atom gains or lose an electron to another atom. Ionic bonds are polar with a + and – side. These bonds break apart easily in water which also has a polar molecular arrangement of an oxygen atom and two hydrogen atoms.

This polar structure of water is one reason why it is such a good solvent.

In nature, energy is passing from one molecule to another changing them as the molecules gain or lose electrons. Without this process, there would be no break down of minerals, or carbon, no photosynthesis, no digestion, no you. Oxidation is an increase in the oxidation number by an atom or molecule. Reduction is a decrease in the oxidation number. An oxidant removes electrons from another reductant. Reductants transfer electrons to oxidants. The reductant loses electrons and is oxidized, and the oxidant gains electrons and is reduced. (http://en.wikipedia.org/wiki/Redox). These energy transfers are what drive life. The energy is usually a hydrogen atom. When a hydrogen atom is removed from an organic compound (contains carbon) some of the energy comes with to the hydrogen acceptor.

In non-cyclic photosynthesis in one phase, water is oxidized to create ATP and NADP (energy transfer molecules), and in another step carbon dioxide is reduced to build sugars by combining carbon with the hydrogen from the water. In non-cyclic photosynthesis, oxygen we need to breathe is a byproduct, and released with water into the air.